

1

3,483,156

## METHOD OF PREPARING TAPE JOINT CEMENT

Edward J. Mills, Jr., and John F. Suter, Charleston, W. Va., assignors to Union Carbide Corporation, a corporation of New York

No Drawing. Filed Dec. 12, 1966, Ser. No. 600,741

Int. Cl. C08f 29/42; C09j 3/14

U.S. Cl. 260—29.6

6 Claims

### ABSTRACT OF THE DISCLOSURE

A sensibly dry free-flowing powder adapted to be mixed with water to form a tape joint cement is formulated by first preparing an intimate admixture of powdered mica and an aqueous dispersion of poly(vinyl acetate) and then blending this admixture with one or more inert fillers selected from the group consisting of calcium carbonate, clay, silica and asbestos, while adjusting the water content to provide 8% to about 20% by weight water as herein-after described.

This invention relates in general to tape joint cements and in particular to a novel method for the preparation of a sensibly dry free-flowing composition adapted to be mixed with water to form a tape joint cement.

Tape joint cements are utilized in the application of wall board, their function being to fill the spaces between adjoining boards to provide a smooth seamless surface. Typically, the space is filled with the tape joint cement and lapped for an inch or two to either side on the wallboard, a perforated paper tape is pressed into the cement until embedded, and one or more additional coats of cement are then applied.

Tape joint cements are currently marketed in two forms, namely, a "ready mix" which is a finished formulation needing only stirring before application and a "dry mixture" which is in the form of a sensibly dry free-flowing powder to which water is added and stirred until a workable consistency is attained. In either form, the essential components are a major proportion of an inert filler, such as, for example, calcium carbonate, clay, mica, silica, asbestos, and the like, and a minor proportion of a binder which serves to hold the cement together and prevent crumbling, to adhesively bond to the wallboard, and to secure the tape.

Various materials have been proposed heretofore for use as a binder in the "dry mixture" type of formulation. In certain instances, the "dry mixture" has been prepared by blending of two ingredients each of which is itself in a dry state. For example, the dry inert filler, or mixture of fillers, is blended with powdered casein or with a spray-dried poly(vinyl acetate) resin, such as is described in United States Patent 2,800,463. An alternate technique, also known to the art, is to prepare the "dry mixture" by blending the dry inert filler with an aqueous solution or dispersion of polyvinyl alcohol, the amount of the aqueous solution or dispersion employed being limited to that at which the blend will be sensibly dry, i.e., dry to the touch and capable of being packed as a dry product. This method is disclosed in United States Patent 3,084,133. Each of these prior art procedures, however, suffers from certain disadvantages. Thus, for example, the blend of inert filler and powdered casein can be mixed with water to give a uniform composition only with great difficulty and, furthermore, the casein is subject to putrefaction on ageing. These problems are avoided by the use of spray-dried poly(vinyl acetate) resin, but this material, because of the complex procedure involved in recovering the resin in dry form, is ordinarily too expensive for use in tape joint cements. Moreover, elaborate precautions must be taken to ensure that the blend of filler and spray-

2

dried poly(vinyl acetate) remains dry until ready for use for the reason that if agglomeration occurs because of blocking of the resin then when water is added in preparation for use the resulting tape joint cement will contain undispersed particles. The sensibly dry blend of inert filler and aqueous solution or dispersion of polyvinyl alcohol mixes readily with water to form a workable consistency, but the polyvinyl alcohol is sensitive to any trace of borax in the mixing equipment or on the surface being covered and the ensuing reaction causes gelation and precipitation in the cement.

It has now been discovered that a sensibly dry free-flowing composition which may be stored and is easily mixed with water to form a tape joint cement and which successfully avoids the disadvantages of the prior art can be prepared by the novel method which is hereinafter described. This method utilizes as binder an aqueous dispersion of poly(vinyl acetate), a product which is of very low cost relative to a spray-dried poly(vinyl acetate) resin, and, contrary to what was heretofore believed, as evidenced by the teachings of United States Patent 3,084,133, achieves adequate binding power at commercially feasible concentrations of resin in the tape joint cement.

In accordance with the present invention, a sensibly dry free-flowing powder adapted to be mixed with water to form a tape joint cement is formulated by first preparing an intimate admixture of powdered mica and an aqueous dispersion of poly(vinyl acetate) and then blending this admixture with one or more inert fillers selected from the group consisting of calcium carbonate, clay, silica and asbestos, while adjusting the water content as herein-after described. Other conventional components of tape joint cements such as preservatives, surface active agents, plasticizers, filming aids, thickening agents, tackifiers, and so forth, may also be added depending on the requirements of the particular application.

It was unexpected and surprising to find that an aqueous dispersion of poly(vinyl acetate) could be utilized as the binder in a tape joint cement of the "dry mixture" type and that this could be accomplished by the simple expedient of first mixing the aqueous dispersion of poly(vinyl acetate) with powdered mica and then blending the poly(vinyl acetate)/mica mixture with other conventional ingredients of a tape joint cement and properly regulating the water content of the resulting "dry mixture." In particular, it was found that it is essential to the success of this procedure to employ mica, rather than other conventional inert fillers, to form the initial mixture, as only by this technique can a product which is smooth and free of agglomerates be obtained. This is apparently due to differences between mica and other conventional inert fillers in wetting characteristics and affinity for poly(vinyl acetate) resin particles, although applicants do not, of course, intend to be bound by any such explanation. It is also essential to the success of the method of this invention to establish a water content within specified limits, as hereinafter disclosed, in the final "dry mixture" in order to have a sensibly dry free-flowing powder to which the user can add water to produce a tape joint cement without risk of the formation of agglomerates which would render the cement unusable.

The aqueous dispersions of poly(vinyl acetate) of utility for the purposes of this invention are those containing from about 40 to about 65 percent by weight resin solids, more preferably from about 50 to about 60 percent by weight. The particle size of the resin is not critical as it is essential only that the dispersion be stable, i.e. not subject to precipitation or coagulation under the conditions of use. Generally, the particle size will be in the range from about 0.1 to about 8 microns and more preferably in the range from about 0.5 to about 3 microns. The resin may be a homopolymer of vinyl acetate or a